AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) An electric arc welding system for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveforms have a positive portion and a negative portion and a cycle period of about 10-20 ms, a detector arrangement configured to detect, at any given time, the polarity of the first waveform of the first AC welding arc and the polarity of the second waveform of the second AC welding arc, a comparator arrangement configured to receive and compare the detected polarities of the first waveform and the second waveform and to determine when the polarities are the same, which identifies a pull state, and when the polarities are opposite, which identifies a push state, a first timing circuit for determining the push time of a sustained maintenance of opposite polarity between said waveforms and a waveform adjusting circuit to limit said push time to less than about 5.0 ms.

2. (Original) An electric arc welding system as defined in claim 1 wherein said AC waveforms are generally sinusoidal.

3. (Canceled)

4. (Original) An electric arc welding system as defined in claim 1 including a second timing circuit for determining the pull time of a sustained maintenance of the same polarity between said waveforms and a second waveform adjusting circuit to limit said pull time to less than about 5.0 ms.

5. (Original) An electric arc welding system as defined in claim 4 wherein one of said waveforms is generally a square AC waveform.

6. (Original) An electric arc welding system as defined in claim 1 wherein one of said waveforms is generally a square AC waveform.

7. (Original) An electric arc welding system as defined in claim 4 wherein both of said waveforms are generally a square AC waveform.

8. (Original) An electric arc welding system as defined in claim 1 wherein both of said waveforms are generally a square AC waveform.

9. (Original) An electric arc welding system as defined in claim 4 wherein one of said waveforms is a pulse AC waveform.

10. (Original) An electric arc welding system as defined in claim 1 wherein one of said waveforms is a pulse AC waveform.

11. (Currently amended) An electric arc welding system for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveforms have a positive portion and a negative portion and a cycle period of about 10-20 ms, a detector arrangement configured to detect, at any given time, the polarity of the first waveform of the first AC welding arc and the polarity of the second waveform of the second AC welding arc, a comparator arrangement configured to receive and compare the detected polarities of the first waveform and the second waveform and to determine when the polarities are the same, which identifies a pull state, and when the polarities are opposite, which identifies a push state, a timing circuit for determining the pull time of a sustained maintenance of same

polarity between said waveforms and a waveform adjusting circuit to limit said pull time to less than about 5.0 ms.

12. (Original) An electric arc welding system as defined in claim 11 wherein said AC waveforms are generally sinusoidal.

13. (Canceled)

14. (Canceled)

15. (Canceled)

16. (Original) An electric arc welding system as defined in claim 11 wherein both of said waveforms are generally a square AC waveform.

17. (Canceled)

18. (Original) An electric arc welding system as defined in claim 11 wherein one of said waveforms is a pulse AC waveform.

19. (Currently amended) An electric arc welding method for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a

second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveform have a positive portion and a negative portion and a cycle period of about 10-20 ms, said method comprising:

(a) detecting, at any given time, the polarity of the first waveform of the first AC welding arc and the polarity of the second waveform of the second AC welding arc;

(b) comparing the detected polarities of the first waveform and the second waveform;

(c) determining when if the polarities are the same and when the polarities are opposite, wherein when the polarities are the same a pull state exists and when the polarities are opposite a push state exists;

(~~a~~d) determining the push time of a sustained maintenance of opposite polarity between said waveforms; and,

(~~b~~e) adjusting said waveforms to limit said push time to less than about 5.0 ms.

20. (Original) An electric arc welding method as defined in claim 19 wherein said AC waveforms are generally sinusoidal.

21. (Currently amended) An electric arc welding method as defined in claim 20 further including:

(~~e~~f) determining the pull time of a sustained maintenance of the same polarity between said waveforms; and,

(~~d~~g) adjusting said waveforms to limit said pull time to less than about 5.0 ms.

22. (Original) An electric arc welding method as defined in claim 19 including a second timing circuit for determining the pull time of a sustained maintenance of the same polarity between said waveforms and a second waveform adjusting circuit to limit said pull time to less than about 5.0 ms.

23. (Original) An electric arc welding method as defined in claim 22 wherein one of said waveforms is generally a square AC waveform.

24. (Original) An electric arc welding method as defined in claim 19 wherein one of said waveforms is generally a square AC waveform.

25. (Original) An electric arc welding method as defined in claim 22 wherein both of said waveforms are generally a square AC waveform.

26. (Original) An electric arc welding method as defined in claim 19 wherein both of said waveforms are generally a square AC waveform.

27. (Original) An electric arc welding method as defined in claim 22 wherein one of said waveforms is a pulse AC waveform.

28. (Original) An electric arc welding method as defined in claim 19 wherein one of said waveforms is a pulse AC waveform.

29. (Currently amended) An electric arc welding method for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveforms have a positive portion and a negative portion and a cycle period of about 10-20 ms, said method comprising:

(a) detecting, at any given time, the polarity of the first waveform of the first AC welding arc and the polarity of the second waveform of the second AC welding arc;

(b) comparing the detected polarities of the first waveform and the second waveform;

(c) determining when if the polarities are the same and when the polarities are opposite, wherein when the polarities are the same a pull state exists and when the polarities are opposite a push state exists;

(~~a~~d) determining the pull time of a sustained maintenance of same polarity between said waveforms; and,

(~~b~~e) adjusting said waveforms to limit said pull time to less than about 5.0 ms.

30. (Original) An electric arc welding method as defined in claim 29 wherein said AC waveforms are generally sinusoidal.

31. (Canceled)

32. (Original) An electric arc welding method as defined in claim 29 wherein one of said waveforms is generally a square AC waveform.

33. (Canceled)

34. (Original) An electric arc welding method as defined in claim 29 wherein both of said waveforms are generally a square AC waveform.

35. (Canceled)

36. (Canceled)

37. (Original) An electric arc welding method as defined in claim 29 wherein the welding process is submerged arc.

38. (Original) An electric arc welding method as defined in claim 19 wherein the welding process is submerged arc.

39. (Original) An electric arc welding system as defined in claim 11 wherein said system is a submerged arc system.

40. (Original) An electric arc welding system as defined in claim 1 wherein said system is a submerged arc system.

41. (New) An electric arc welding system as defined in claim 1, wherein the first timing circuit is adjustable.

42. (New) An electric arc welding system as defined in claim 1, wherein the first electrode and the second electrode arc configured as tandem electrodes.

43. (New) An electric arc welding system as defined in claim 1, wherein a phase change between the first waveform of the first electrode and the second waveform of the second electrode are alterable in increments of one degree.

44. (New) An electric arc welding system as defined in claim 1, further including a controller which controls operation of the detector arrangement, comparator arrangement, the first timing circuit and waveform adjusting circuit.

45. (New) An electric arc welding method as defined in claim 19, further including adjusting operation of the timing circuit.

46. (New) An electric arc welding method as defined in claim 19, further including configuring the first electrode and the second electrode as tandem electrodes.

47. (New) An electric arc welding method as defined in claim 19, further including providing a phase change between the first waveform of the first electrode and the second waveform of the second electrode in a one degree increment.

48. (New) An electric arc welding method as defined in claim 19, further including controlling operation of the detector arrangement, comparator arrangement, the first timing circuit and waveform adjusting circuit by a controller of the welding system.